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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/941,183	08/27/2001	Giorgi Bit-Babik	CM03482J	7074

24273 7590 09/11/2003

MOTOROLA, INC  
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EXAMINER

CHEN, SHIH CHAO

ART UNIT PAPER NUMBER

2821

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/941,183

Applicant(s)

BIT-BABIK ET AL.

Examiner

Shih-Chao Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 November 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 40-47 is/are allowed.
- 6) ☒ Claim(s) 1-29 and 48-53 is/are rejected.
- 7) ☒ Claim(s) 30-39 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. In response to the communication dated August 27, 2001 through November 06, 2002, claims 1-53 are active in this application.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) filed on August 27, 2001 has been considered.

### ***Specification***

3. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims <sup>1-28 and 48-53</sup> are rejected under 35 U.S.C. 102(e) as being anticipated by Lim (U.S. Patent No. 6,292,141).

Regarding claim 1, Lim teaches in figures 1-8 an antenna system comprising: a dielectric resonator antenna [402] dimensioned to support: a first mode (i.e. S-band) characterized by a first center frequency and a first bandwidth; and a second mode (L-

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band) characterized by a second center frequency and a second bandwidth (See col. 4, lines 4-6); wherein the first bandwidth is at least about one-half of a difference between the first center frequency and the second center frequency.

Regarding claim 2, Lim teaches in figures 1-8 the antenna system according to claim 1 wherein: the second bandwidth is at least about one-half of the difference between the first center frequency and the second center frequency.

Regarding claim 3, Lim teaches in figures 1-8 the antenna system according to claim 2 wherein: the first bandwidth is less than about two times the difference between the first center frequency and the second center frequency; and the second bandwidth is equal to less than about two times the difference between the first center frequency and the second center frequency.

Regarding claim 4, Lim teaches in figures 1-8 the antenna system according to claim 3 wherein: the dielectric resonator antenna is prism shaped (See col. 3, lines 11-13).

Regarding claim 5, Lim teaches in figures 1-8 an antenna system comprising: a dielectric resonator antenna [402] characterized by: a surface area,  $A$ ; a volume,  $V$ ; and a quantity  $A*\lambda/V$  that is at least about 50 (i.e.  $\epsilon=25$ ; col. 4, lines 7-12), where  $\lambda$  is a free space wavelength corresponding to a center frequency of a lowest order mode of the dielectric resonator antenna [402].

Regarding claim 6, Lim teaches in figures 1-8 the antenna system according to claim 5 wherein: the quantity  $A*\lambda/V$  is at least about 100 (i.e.  $\epsilon=50$ ; col. 4, lines 7-12).

Regarding claim 7, Lim teaches in figures 1-8 the antenna system according to claim 5 wherein the dielectric resonator antenna [402] has a dielectric constant of at least about 25 (See col. 4, lines 7-12).

Regarding claim 8, Lim teaches in figures 1-8 the antenna system according to claim 7 wherein the dielectric resonator antenna [402] has a dielectric constant of at least about 40 (See col. 4, lines 7-12).

Regarding claim 9, Lim teaches in figures 1-8 the antenna system according to claim 8 wherein: the dielectric resonator antenna [402] is made from material selected from the group consisting of: Neodymium Titanate and Magnesium Calcium Titanate (See col. 6, lines 19-27).

Regarding claim 10, Lim teaches in figures 1-8 the antenna system according to claim 5 wherein: the dielectric resonator antenna [402] includes: a first large area surface; a second large area surface; and is further characterized by: a thickness  $T$  measured between the first large area surface and the second large area surface; a height,  $H$ ; and a length,  $L$ .

Regarding claim 11, Lim teaches in figures 1-8 the antenna system according to claim 10 wherein: a ratio of the length of the dielectric resonator antenna [402] to the thickness of the dielectric resonator antenna is at least about 10 (See col. 4, lines 7-13).

Regarding claim 12, Lim teaches in figures 1-8 the antenna system according to claim 11 wherein: the height of the dielectric resonator antenna [402] is between about  $1/4$  and one times the length of the dielectric resonator antenna (See col. 4, lines 7-13).

Regarding claim 13, Lim teaches in figures 1-8 the antenna system according to claim 12 wherein: the dielectric resonator antenna [402] is right parallelepiped in shape (See col. 3, lines 11-13).

Regarding claim 14, Lim teaches in figures 1-8 the antennae system according to claim 5 further comprising: a first edge extending between the first large area surface and the second large area surface; and a microstrip [410] arranged parallel to and adjacent to the first edge.

Regarding claim 15, Lim teaches in figures 1-8 the antenna system according to claim 14 further comprising: a spacer layer [408] located between the microstrip [410] and the first edge of the dielectric resonator antenna [402].

Regarding claim 16, Lim teaches in figures 1-8 the antenna system according to claim 15 wherein: the spacer layer [408] comprises a material selected from the polytetrafluoroethylene.

Regarding claim 17, Lim teaches in figures 1-8 the antenna system according to claim 15 wherein: the spacer layer [408] has a thickness of between about 50 and 500 microns, and a dielectric constant of less than about 4.

Regarding claim 18, Lim teaches in figures 1-8 the antenna system according to claim 5 further comprising: a conductive shield [406] that has a width measured parallel to the thickness of the dielectric resonator antenna [402] that is equal to at least about 0.95 times the height of the dielectric resonator antenna [402] (See col. 10, lines 28-31).

Regarding claim 19, Lim teaches in figures 1-8 the antenna system according to claim 18 wherein: the width of the conductive shield [406] is less than about 3.5 times the height of the dielectric resonator antenna [402] (See col. 10, lines 28-31).

Regarding claim 20, Lim teaches in figures 1-8 the antenna system according to claim 18 wherein: the conductive shield [406] comprises a microstrip ground plane.

Regarding claim 21, Lim teaches in figures 1-8 an antenna system comprising: a dielectric resonator antenna [402]; and a microstrip [410] including one or more charge accumulation regions (i.e. capacitor or capacitance) proximate to the dielectric resonator antenna [402].

Regarding claim 22, Lim teaches in figures 1-8 the antenna system according to claim 21 wherein the microstrip [410] comprises three or more charge accumulation regions.

Regarding claim 23, Lim teaches in figures 1-8 the antenna, system according to claim 22 wherein: the dielectric resonator antenna [402] is parallelepiped in shape (See col. 10, lines 5-10) and comprises: a first large area surface characterized by a height, and a length that is measured parallel to the microstrip [410]; a second large area surface that is characterized by the height and the length, is opposite to the first large area surface, and is separated from the first large area surface by a thickness dimension; and a first edge that extends between the first large area surface and the second large area surface and is located proximate to the three or more charge accumulation regions.

Regarding claim 24, Lim teaches in figures 1-8 the antennas system according to claim 23 wherein: a ratio of the length to the thickness dimension is at least about 10 (See col. 4, lines 7-13).

Regarding claim 25, Lim teaches in figures 1-8 the antenna system according to claim 24 wherein: the dielectric resonator antenna [402] has a dielectric constant of at least about twenty five (See col. 4, lines 7-13).

Regarding claim 26, Lim teaches in figures 1-8 the antenna system according to claim 25 wherein: the dielectric resonator antenna [402] has a dielectric constant of at least about forty (See col. 4, lines 7-13).

Regarding claim 27, Lim teaches in figures 1-8 the antenna system according to claim 26 further comprising: a spacer layer [408] located between the dielectric resonator antenna [402] and the microstrip [410] that has a dielectric constant of less than about 4 and a thickness between about 50 and 500 microns.

Regarding claim 28, Lim teaches in figures 1-8 the antenna system according to claim 27 wherein: the spacer layer [408] comprises a material selected from polytetrafluoroethylene.

Regarding claim 48, Lim teaches in figures 1-8 an antenna system comprising: a ground plane [406]; a circuit substrate [408] including an obverse side and a reverse side that includes a first area covered by the ground plane [406] and a second area that is not covered by the ground plane; a dielectric resonator antenna [402] supported on the obverse side, over the clear area, the dielectric resonator antenna [402] including an



edge; and a microstrip [410] on the obverse side, the microstrip [410] including an end segment parallel to and proximate to the edge.

Regarding claim 49, Lim teaches in figures 1-8 the antenna system according to claim 48 wherein: the dielectric resonator antenna [402] comprises a parallelepiped (See col. 10, lines 7-10) characterized by a length, height, and a thickness measured perpendicular the circuit substrate [408], and a ratio of the length to the thickness is at least about 10 (See col. 4, lines 7-13).

Regarding claim 50, Lim teaches in figures 1-8 the antennas system according to claim 48 wherein: the dielectric resonator antenna [402] is characterized by: a surface area  $A$ ; a volume  $V$ ; and a quantity  $A * \lambda/V$  that is at least about 50 (See col. 4, lines 7-13), where  $\lambda$  is a free space wavelength associated with a lowest order mode of the dielectric resonator antenna.

Regarding claim 51, Lim teaches in figures 1-8 a wireless telephone (See col. 8, lines 35-39) having a front side and a back side, the wireless telephone further comprising: a speaker mounted at the front side of the wireless telephone; a microphone mounted at the front side of the wireless telephone; a dielectric resonator antenna [402] positioned within the wireless telephone; and a conductive shield [406] located between the dielectric resonator antenna [402] and the front side.

Regarding claim 52, Lim teaches in figures 1-8 the wireless telephone according to claim 51 further wherein: the conductive shield [406] comprises a ground plane.

Regarding claim 53, Lim teaches in figures 1-8 the wireless telephone according to claim 52 further comprising: a substrate [404] including: a first surface supporting the

ground plane [406]; and a second surface supporting the dielectric resonator antenna [402].

6. Claim 29 is rejected under 35 U.S.C. 102(e) as being anticipated by Heinrichs et al. (U.S. Patent No. 6,323,824).

Regarding claim 29, Heinrichs et al. teaches in figures 1-4 an antenna system comprising: a dielectric resonator antenna [4] including: a first large area surface; a second large area surface opposite to the first large area surface (See FIG. 4); and a first edge that extends between the first large area surface and the second large area surface; a parasitic element [6] positioned along the first edge; and a signal feed [9] for coupling signals to and from the dielectric resonator antenna [4].

***Allowable Subject Matter***

7. Claims 40-47 are allowed.

8. Claims 30-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither teach nor make it obvious the claimed limitation of the instant application as a whole as recited in claim 40. In particular, the prior art does not teach or suggest a conductor including a first end positioned proximate the dielectric resonator antenna. The dependent claims are allowable for at least the above reason.

The prior art does not teach or suggest the parasitic element is capacitively loaded as required by claim 30. The dependent claims are allowable for at least the above reason.

***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-Chao Chen whose telephone number is (703) 306-2721. The examiner can normally be reached on Monday-Friday from 7 AM to 4:30 PM, First Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (703) 308-4856. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

*Shih-Chao Chen*

Shih-Chao Chen  
Examiner  
Art Unit 2821

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